

Rapa Nui Landscapes of Construction Project (LOC4)

Report on Geophysical Survey of *Moai* Along the Southern *Ara Moai*



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Rapa Nui Landscapes of Construction

The Rapa Nui Landscapes of Construction Project (LOC) is funded by a grant from the Arts and Humanities Research Council in the UK. Based at the Institute of Archaeology, University College London, the project is directed by Sue Hamilton of UCL (principal investigator) and Colin Richards of the University of Manchester (co-investigator), in collaboration with Kate Welham of Bournemouth University (co-investigator). The University of the Highlands and Islands (Project Partner) is represented by Jane Downes.

On the Island, LOC works with Rapanui elders and students and in close cooperation with the *Corporacion National Forestal (CONAF)*, Rapa Nui, and the *Museo Antropológico P. Sebastián Englert (MAPSE)*.

The main aim of the project is to investigate the construction activities associated with the Island's famous prehistoric statues and architecture as an integrated whole. These construction activities, which include quarrying, moving and setting up of the statues are considered in terms of Island-wide resources, social organisation and ideology.

The Project is not just concerned with reconstructing the past of the island, but is also contributing to the 'living archaeology' of the present-day community, for whom it is an integral part of their identity and their understanding and use of the island. LOC is working with the Rapanui community to provide training and help in recording, investigating and conserving their remarkable archaeological past. Fieldwork between 2008 and 2013 was undertaken under a permit issued by the *Consejo de Monumentos Nacionales*, Chile (ORN No 1699 CARTA 720 DEL 31 del 01.2008).

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Report on Geophysical Survey of *Moai* Along the Southern *Ara Moai*

by Colin Richards

1. Introduction

Much discussion has surrounded the status of the single statues laying along the routes of the so-called *moai* roads (*ara moai*), which radiate from the *moai* quarry of Rano Raraku, Rapa Nui. Interpretations of the roads themselves has heavily influenced this discussion, particularly the assumption that the roads were constructed for the sole purpose of transporting *moai* from the Rano Raraku quarry to different *ahu* around the island (e.g. Love 2001).

Fascinated by the occurrence of numerous isolated *moai*, together with the practicality of their transportation to coastal *ahu* throughout the island, Katherine Routledge (1919, 194) became convinced that some form of road network must have existed in the past. The actual discovery of the road network occurred late on a sunny afternoon during her stay on the island. After ascending the summit of Maunga Toa Toa, 2 miles west of Rano Raraku, she notes:

“the level rays of the sinking sun showed up the inequalities of the ground, and, looking toward the sea, along the level plain of the south coast, the old track was clearly seen; it was slightly raised over lower ground and depressed somewhat through higher, and along it every few hundred yards lay a statue” (*ibid.*, 194).

This was the first recorded sighting of an ancient roadway on Rapa Nui. Significantly, the road identified radiated in a southwesterly direction from Rano Raraku, and “as a clue had now been obtained, it was comparatively simple to trace two other roads from Rano Raraku” (*ibid.*). These additional roads led west and north from the quarry. More recently, Love has investigated the line of the roads culminating in excavation of several sections of the southern road in 2001 (Love 2001). Employing satellite imagery and field survey, Lipo & Hunt (2005) have added further sections and stretches of road to those recognized by Routledge and Love. An important outcome of this recent research is the identification that the road system possesses a dendritic structure (*Figure 1*). In some respects this organization had been anticipated by Routledge who observed two possible ‘branch’ roads running from the main southern road to the coastal *ahu* at Hanga Tetenga and the Akahanga *ahu* complex (1919, 194). However, the results obtained by Lipo & Hunt (2005), show quite clearly that several roads split internally as they run from Rano Raraku (*Figure 1*).

The association of roads and what Routledge (1919, 193) terms as ‘isolated statues’ initially led her to interpret the *moai* as being abandoned on route to different *ahu*:

“So wedded, however, were we at this time to the theory that they were in the course of transport, that it was seriously considered whether they could have been moved in an upright position” (*ibid.* 195).

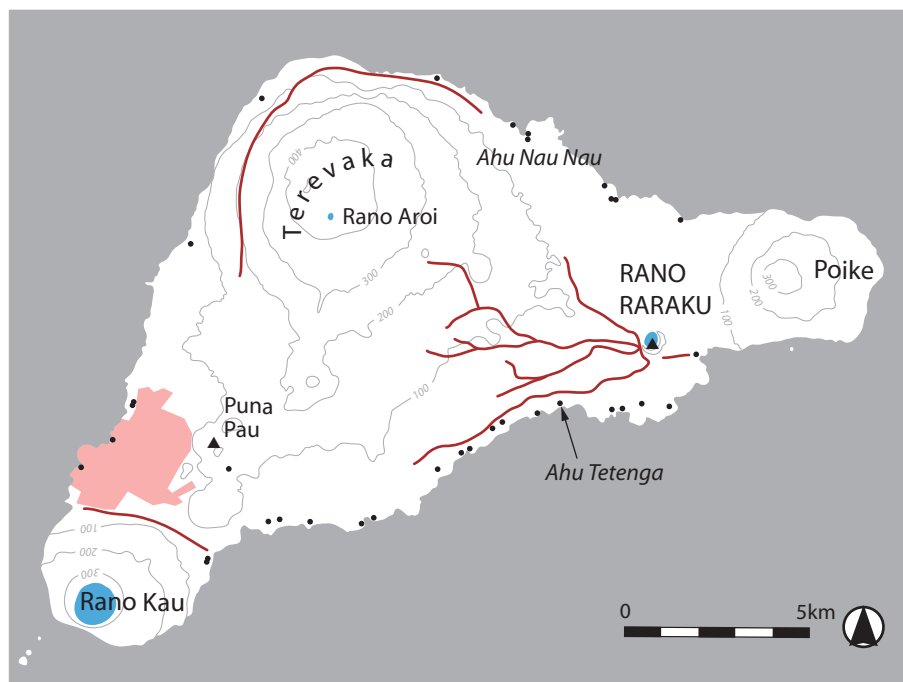


Figure 1.
Road network recognized by Lipo & Hunt

Actually, the vertical transportation of *moai* continues to be accepted by some researchers (e.g. Heyerdahl 1989; Love 2001). However, for Routledge a question remained: “if the images were really being moved to their respective ahu all around the coast, how was it that, with very few exceptions, they were all found in the neighbourhood of Raraku?” (*ibid.*). This led to a reconsideration of the nature of both the isolated statues and the roadways. In order to resolve the question she undertook excavations around several recumbent *moai*, the locations of which were not identified in the 1919 publication. One excavation though was described as that of a partially buried head adjacent to a road situated approximately two miles from Rano Raraku. The result of this enquiry was the discovery of a hole or pit in which the *moai* had once stood (*ibid.* 196). Unfortunately, the position of this excavation is unknown, but the results demonstrated to Routledge that rather than being abandoned ‘in-transit’, the isolated statues had originally been set up in an upright position alongside the roads. On this basis, she provides a graphic account of their role as *moai* lining the route to the great quarry:

“Rano Raraku was, therefore, approached by at least three magnificent avenues, on each of which the pilgrim was greeted at intervals by a stone giant guarding the way to the sacred mountain” (*ibid.*).

In what has become an extremely influential interpretation, Skjölsvold accepted the possibility that in some exceptional circumstances isolated statues were upright, “however, the bulk of the evidence would seem to indicate that the casually deposited statues along the ancient island tracks were abandoned in the course of transportation from the image quarry to their intended ahu” (1961, 379). There are two related assumptions here that have been accepted by subsequent researchers (e.g. Love 2000; Lipo & Hunt 2005, 158; Vargas pers. comm.). Firstly,

that the roads were built to transport the *moai*. Secondly, that the *moai* lying along the roads have been abandoned on route to their destinations.

It is suggested here that Katherine Routledge's ideas concerning the status of the roads and the statues lying along them require further reconsideration. There are several reasons for this reappraisal. The first is the observation that all the statues have clearly fallen from a vertical position and that is why many have been broken by the impact of the fall. Second, judging from their position of rest, they consistently were facing away from the quarry of Rano Raraku. Finally, there is the evidence obtained by Heyerdahl from excavations undertaken in 1986 occurring around the fallen *moai* (Heyerdahl *et al.* 1989).



Figure 2.

*Excavations revealed a 'stone platform' behind moai 478 [13-477]
(Heyerdahl et al. 1989)*

As mentioned above, in her investigation of the 'isolated statues', Routledge discovered that before it fell, one roadside *moai* had previously been standing in a pit (1919, 196). Thor Heyerdahl and Arne Skjölsvold (Heyerdahl *et al.* 1989) excavated two statues along the southern road (Statues 478 [13-477]¹ & 504 [13-52]). Excavation around statue 504 [13-52] was inconclusive although a 'very hard packed' layer was encountered in a discrete area directly behind the statue (*ibid.* 55). The second statue 478 [13-477] lies near the end of the southern road very close to Rano Raraku, adjacent to the wall surrounding the quarry. This excavation revealed a circular stone platform at the base of the fallen *moai* (Figures 2 & 3).

¹ Several different *moai* numbering schemes are used on the Island. Heyerdahl used that of P. Sebastián Englert. That used here is from the *Atlas Arqueológico de Isla de Pascua* (Cristino *et al.* 1980). The 'missing' numbers (e.g. 12-489) belong to archaeological features of other types

Despite the initial interpretation offered by Skjölsvold (1961, 379), that the *moai* along the road were ‘in-transit’, the results from the 1986 excavations forced a concession. In the report of the excavation it is noted that the results “lend support to the assumption by Katherine Routledge that the statues at one time stood on the very spot where they at present lay” (Heyerdahl *et al.* 1989, 56). However, despite the evidence, Heyerdahl and his colleagues refused to change their minds stating that the results of the excavations “may also be interpreted as that the statues were in transport away from the quarries when they were abandoned” (*ibid.* 57).

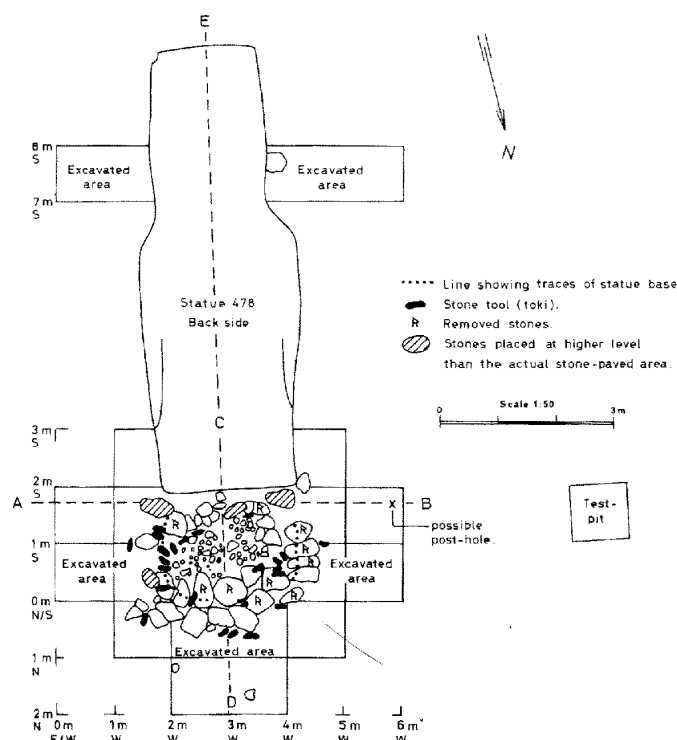


Figure 3.
Plan of the stone platform behind moai 478 [13-477]
(Heyerdahl *et al.* 1989)

In reassessing the excavations of both Routledge and Heyerdahl there seems clear evidence that the so-called ‘in-transit’ statues once stood erect alongside the roadways leading to Rano Raraku. If Routledge (1919, 196) was correct in her interpretation that the roadways were important formal routes to *approach* the quarry, then their position as standing statues provided a mechanism for grading space between the outside world and sacredness of the interior. Much, therefore, depends on whether the stone platform or pits observed by both Routledge and Heyerdahl are representative for all the fallen *moai* along the roads.

2. Participants

In 2010 the Rapa Nui Landscapes of Construction Project was directed by Drs Sue Hamilton of the Institute of Archaeology, University College London, and Colin Richards of the University of Manchester in collaboration with Susana Nahoe of the

Corporacion National Forestal, Rapa Nui and Francisco Torres H. of the *Museo Antropológico P. Sebastián Englert*). The 2010 season was funded by University College London and the University of Manchester.

3. Trial Geophysical Survey Behind a *Moai* on the Southern *Ara Moai*

One way to determine if the observations of Routledge and Heyerdahl are indeed representative of all the fallen *moai* along the roads leading to Rano Raraku is the employment of geophysical survey directly adjacent to the bases of the statues. The detection of sub-surface stone platforms is easily accomplished using resistivity survey. This non-invasive technique is ideal for locating sub-surface features such as a stone platform. Using a 10 x 10m grid and taking readings at 0.5m, the resistivity survey should provide a clear signal if a platform remains. In February 2009 a trial survey was undertaken at Tetenga (*Figure 4*), directly behind *moai* 12-30 (*Figure 5*). This *moai* is situated a short distance from the modern road, on the western side of a short branch *moai* road. The branch road runs off the main southern *moai* road and runs down to the *ahu* at Hanga Tetenga (*Figure 4*).

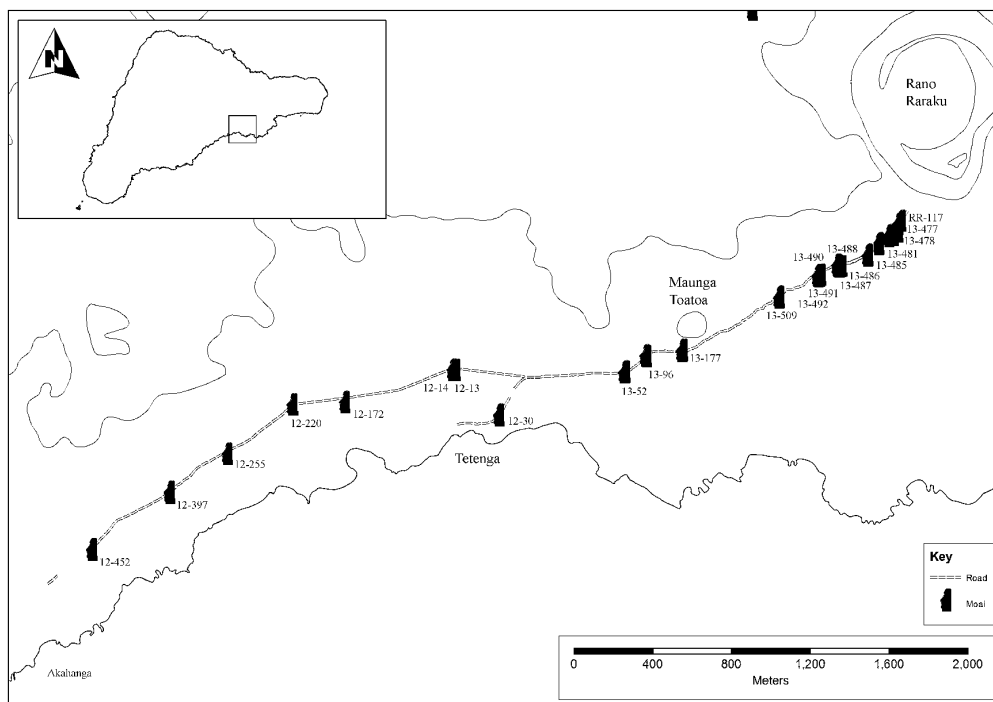


Figure 4.
Map showing position of moai along southern road

The results of this trial survey were extremely good. A small circular area directly behind the statue was detected as having extremely high resistance (*Figure 6*). This is consistent with a discrete area of stonework, and is easily identifiable as the well preserved remains of a stone platform. These results strongly indicated that this method of geophysical survey works extremely well as a tool for locating stone platforms of similar nature to that discovered by Heyerdahl and his team behind statue 13-478 (Heyerdahl *et al.* 1989, 47-52).



Figure 5.
Moai 12-30 at Tetenga

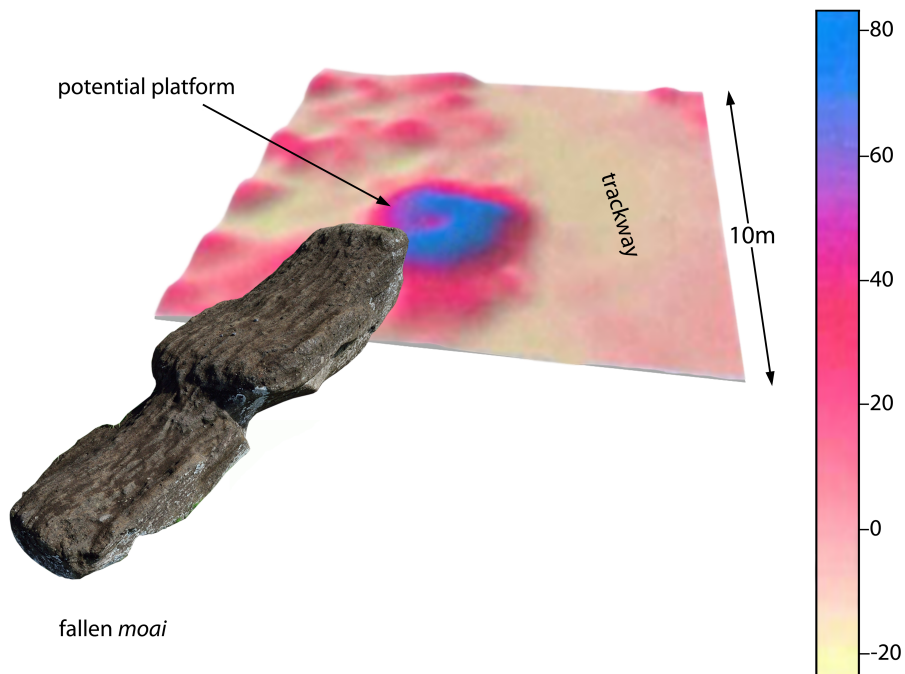


Figure 6.
Results of the resistivity survey behind moai 12-30 — the high resistance area is easily identified

4. Geophysical Survey of *Moai* Along the Southern *Ara Moai*.

Given the successful survey of *moai* 12–30, the project was expanded to incorporate all of the available *moai* along the southern *Ara Moai* (*Figure 4*). Some of the fallen statues, for instance, between Rano Raraku and the small peak of Maunga Toa Toa, have spreads of stone behind their bases prohibiting resistivity survey. However, a number of statues have less stone around their bases and were available for survey. Both recumbent *moai* excavated by Heyerdahl's team in 1986 were identified and discounted from the current fieldwork since the stone platforms or 'compact ground' had been destroyed. Routledge's excavations were more problematic as the locations were unknown, however, at least one *moai* (13–485) had clearly been excavated in the past as a large hollow, surrounded by up-cast, was identifiable at its base. Significantly, incorporated in the up-cast were many stones, some measuring up to 0.4 m in length.

The survey ran along the road in a westerly direction from Rano Raraku and the results will be sequentially ordered accordingly (see *Figure 4* for location).

Moai (Rano Raraku square) RR-117

Resistivity was undertaken over a 10 m square grid adjacent to the base of the statue. The results showed no subsurface feature (*Figure 7*). The results obtained from this square were so heterogeneous that it is suggested that this may well be a previously excavated statue. Given its close proximity to Rano Raraku this seems a strong possibility.

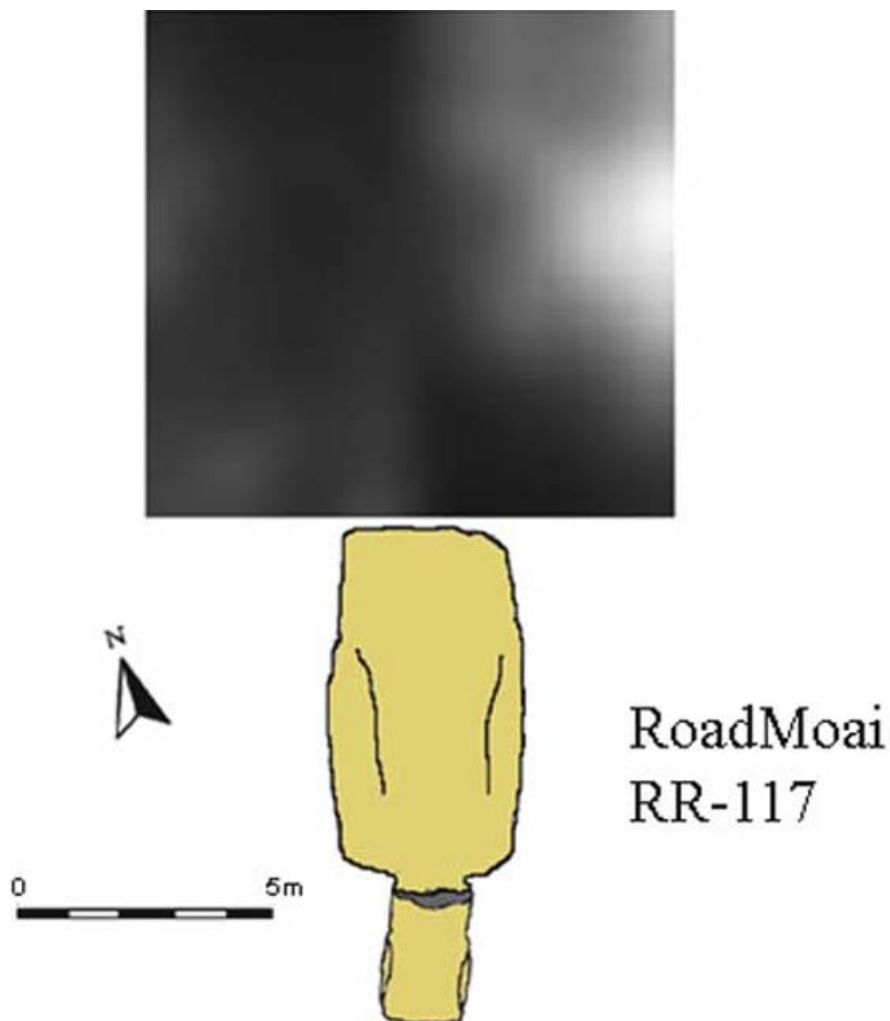


Figure 7.
Resistivity plot of moai RR-117

Moai 13-477

This *moai* was excavated by Heyerdahl in 1986, in the report it is numbered 478 after the recording system imposed by Father Sebastian Englert. An irregular oval stone platform measuring c. 2 x 3m was discovered at a depth of c. 0.25 m directly behind the base of the fallen *moai* (*Figure 3*). No resistivity survey was undertaken.

Moai 13-478

Bedrock was visible on the surface c. 7–8 m beyond the base of the fallen *moai*. Survey over a 10 x 10 m grid resulted in the only example of low resistance readings encountered behind the base of a *moai* (*Figure 8*). Given the undisturbed appearance of the ground, this is unlikely to represent an earlier archaeological excavation. Instead, it may well represent a pit or *moai* socket, a method of support encountered by Routledge (1919).

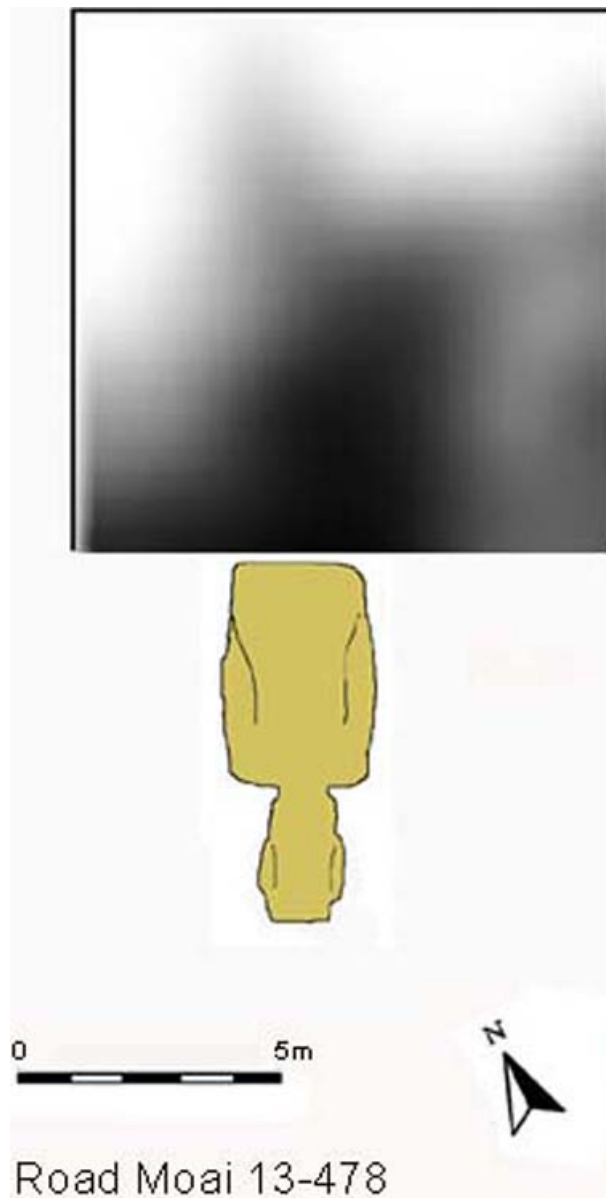


Figure 8.
Resistivity plot of moai 13-478

Moai 13-481

A discrete area of packed stones, measuring c. 1 x 2 m were visible projecting through the surface directly behind this statue. Further visual investigation indicated that the stones ran beneath its base. Consequently, it appeared that the *moai* was partially laying on a basal stone platform. Resistivity over an 8 x 8 m square confirmed this interpretation and a substantial and discrete high resistance feature extends from the base of the fallen *moai* (Figure 9). This is easily interpreted as partially buried stone platform of similar morphology to that uncovered by Heyerdahl and Skjölsvold behind *moai* 13-477.

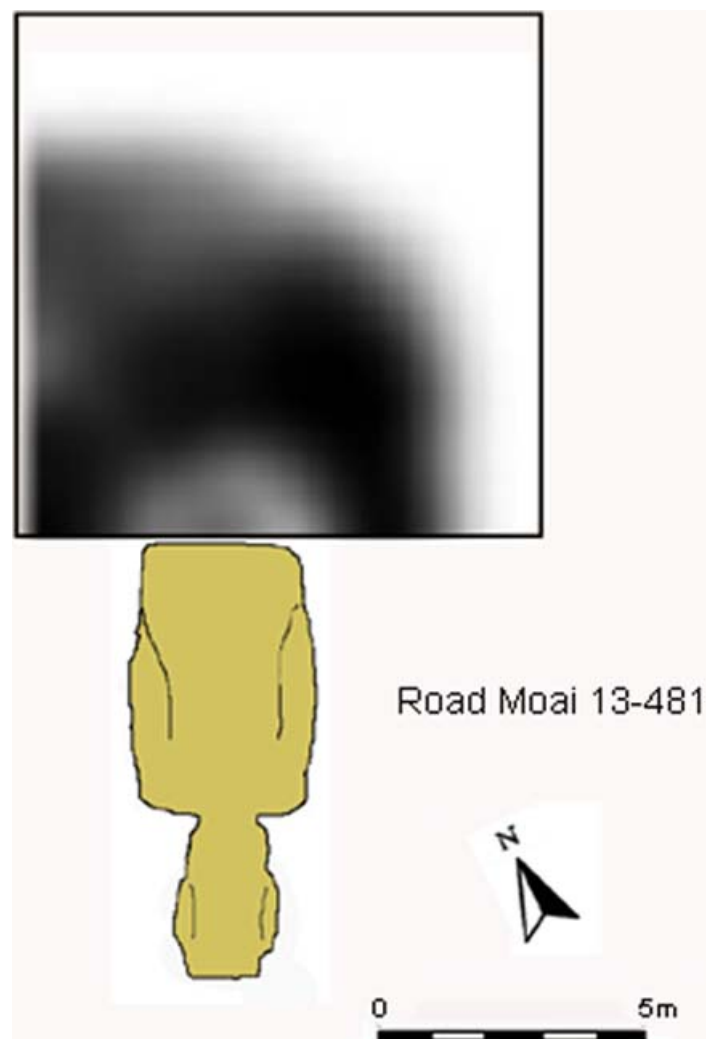


Figure 9.
Resistivity plot of moai 13-481

Moai 13-485

A large hollow with surrounding up-cast is present directly behind this *moai*. This disturbance is clearly the result of an early archaeological investigation, probably conducted by Routledge. Numerous stones are incorporated in the up-cast (*Figure 10*), some of substantial size (c. 0.4 m), indicating the presence of a stone feature directly behind the *moai*. Although there can be no certainty regarding the nature of this feature, it is worth noting that Routledge was expecting to find a pit or socket for the *moai*, as opposed to a stone platform. As the excavated area appears to extend c. 1.5–2 m back from the base of the *moai*, and that the platform discovered by Heyerdahl & Skjölsvold was only a single layer of stones, it must remain a possibility that the earlier excavation dug through a platform feature without recognizing its significance.



Figure 10.
Photograph of hollow and up-cast behind moai 13-485

Moai 13-486

Resistivity was undertaken on an 8 x 8 m grid behind the base of the fallen *moai*. Again stones were observed projecting through the surface, and subsurface stones were felt during the survey. The resistivity plot clearly shows a high resistance feature directly behind the *moai* (Figure 11). This is interpreted as a substantial stone platform.

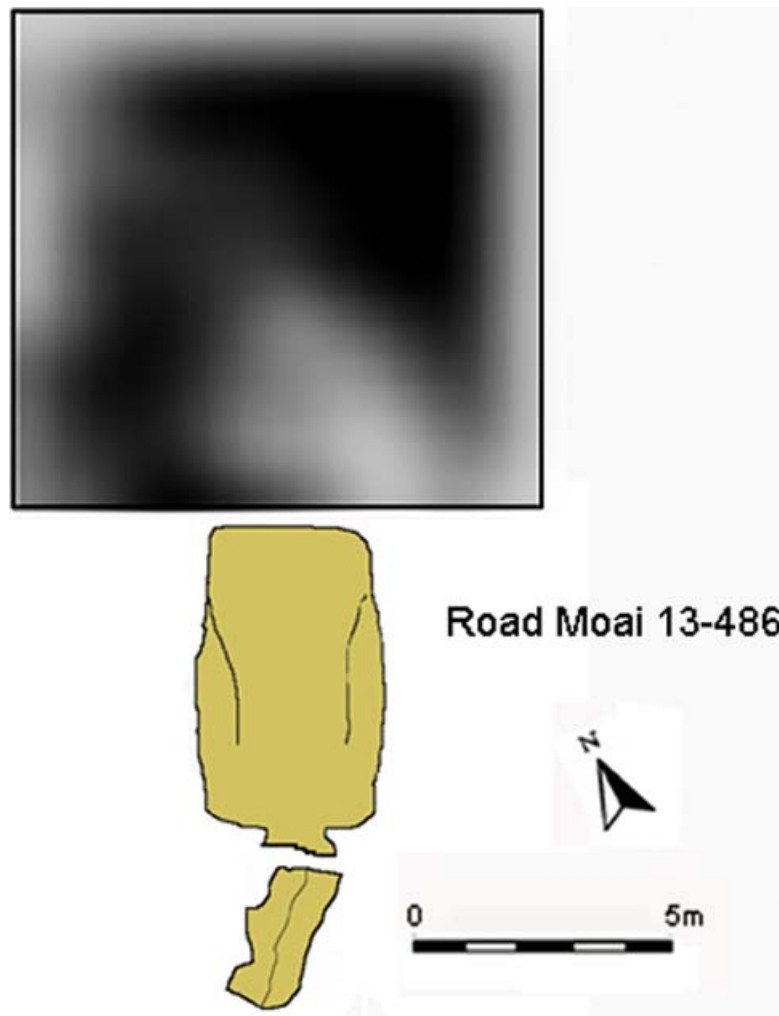


Figure 11.
Resistivity plot of moai 13-486

Moai 13-487, 488, 490 and 491

Large quantities of stone behind the bases of these *moai* prevented resistivity survey.

Moai 13-492

Despite the ground being strewn with stone, an 8 x 8 m resistivity survey was undertaken. The resistivity plot clearly shows a high resistance feature directly behind the fallen *moai* (*Figure 12*). This is interpreted as the remains of a stone platform.

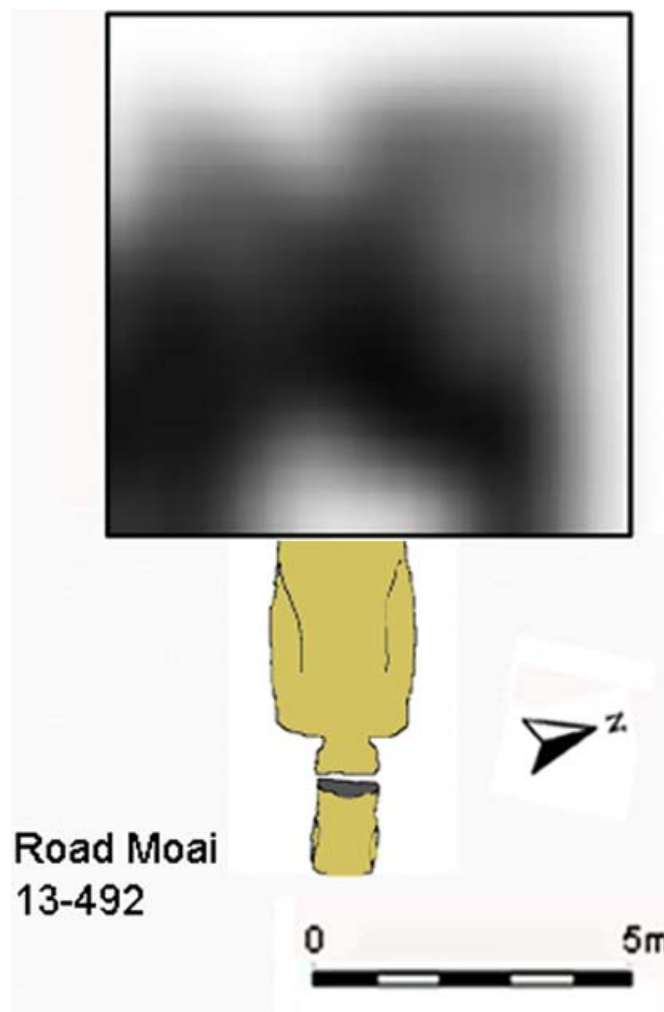


Figure 12.
Resistivity plot of moai 13-492

Moai 13-509

Despite the ground being strewn with stone, an 8 x 8 m resistivity survey was undertaken. At a surface level a sub rectangular feature c. 3 x 3 m, composed of large pebbles (*poro*), extended from the base of the fallen *moai*. The resistivity survey encountered an area of dense stones directly behind the *moai*, consequently a number of 'null' values had to be plotted within this area. When the area of stones is considered together with an area of high resistance directly behind the *moai* base, this too may be interpreted as the remains of a stone platform.

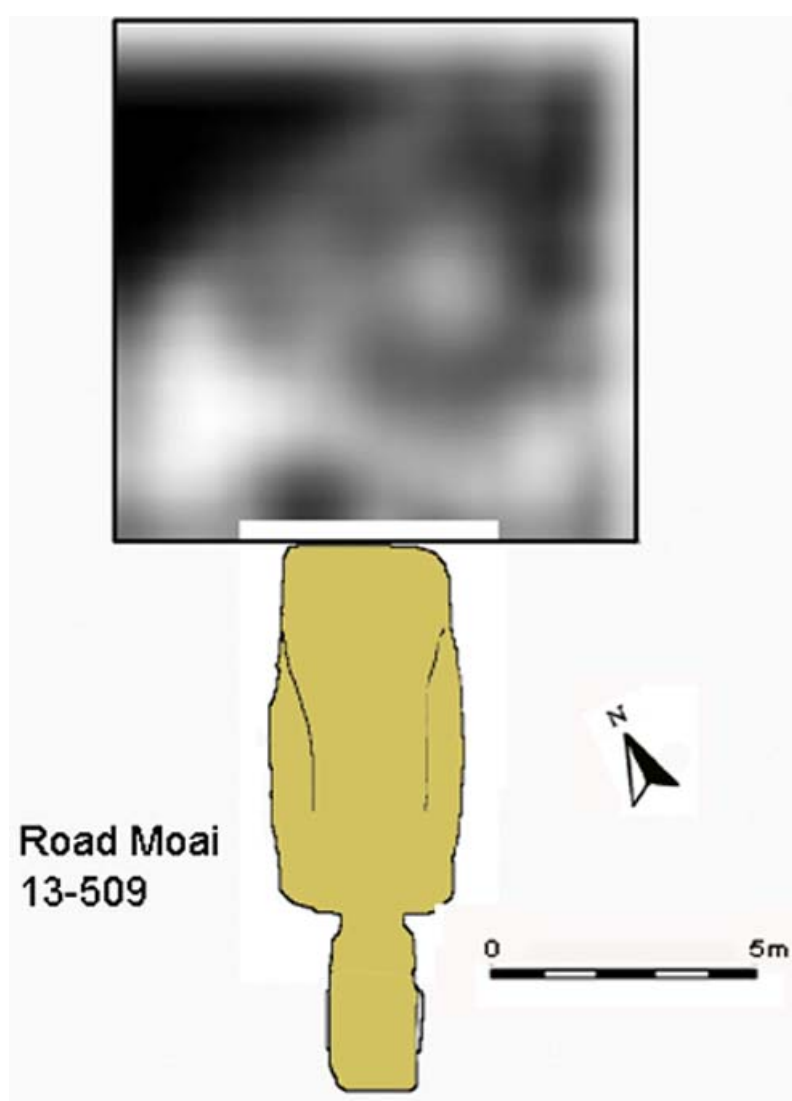


Figure 13.
Resistivity plot of moai 13-509

Moai 13-177

This *moai* lies at the southern base of Maunga Toa Toa. A 10 x 10 m resistivity survey was undertaken adjacent to the base of the recumbent *moai*. The resistivity plot clearly shows a high resistance feature directly behind the fallen *moai* (Figure 14). This is interpreted as the remains of a stone platform.

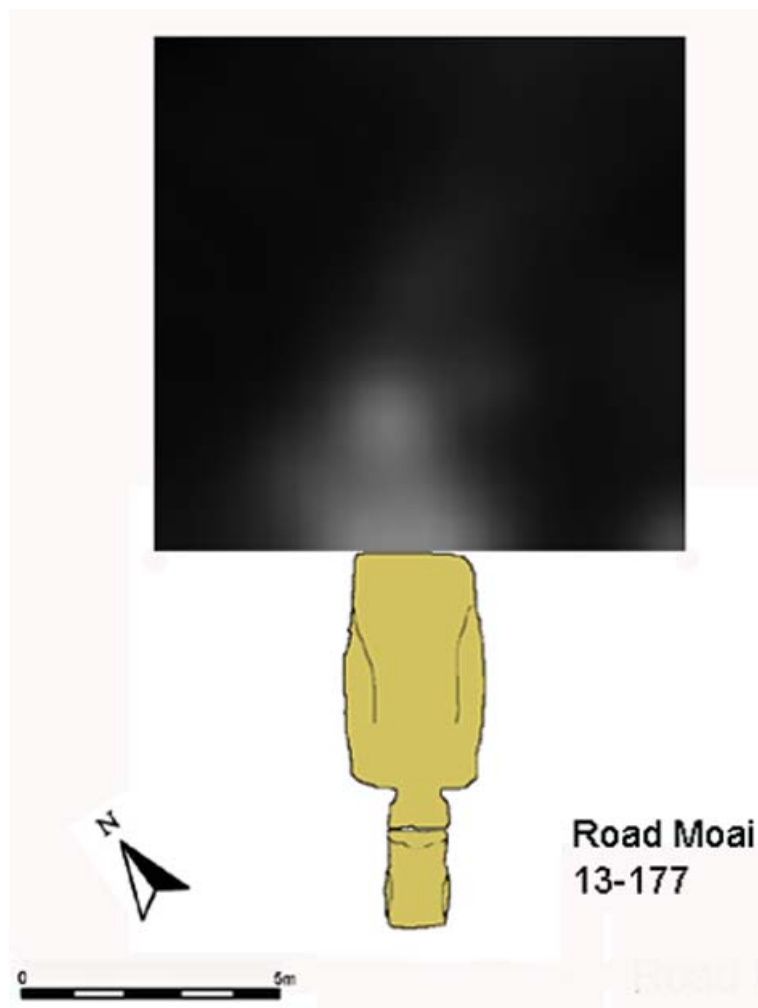


Figure 14.
Resistivity plot of moai 13-177



Figure 15.
Photograph of resistivity survey at moai 13-177

Moai 13-96

A platform-like structure is clearly visible at the rear of this *moai* with earth-fast stones providing a kerb. The large quantities of stone behind the base of the *moai* prevented resistivity survey.

Moai 13-52

This *moai* was the second excavated by Heyerdahl and Skjölsvold in 1986, in the report it is numbered 504 after the recording system of P. Sebastián Englert. Although no stone 'platform' was discovered, at a depth of c. 0.2 m the following was recorded, 'a layer of brown, clayish soil with scattered stones. This layer was 30-34 cm thick and very hard packed, particularly within a narrow area (4 m in width) behind the statue' (Heyerdahl *et al.* 1989, 55).

Moai 12-13

Together with *moai* 12-14, *moai* 12-13 is one of a pair, *moai* 12-13 being the easternmost. Until recently both *moai* were surrounded by a fenced garden plot, and the edge of the cultivated area is clearly visible on the resistivity plot (*Figure 17*). Directly behind the statue, buried stones prohibited some readings, this concurred with an area of high resistance. Taken together this is interpreted as a stone platform being present behind the *moai*.

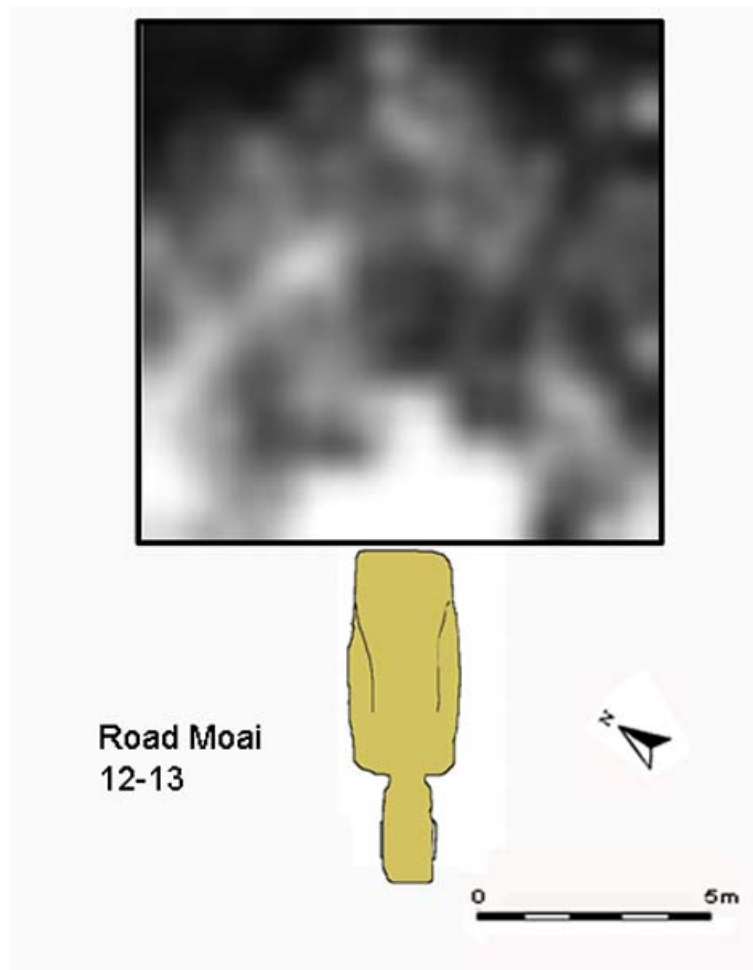


Figure 17.
Resistivity plot of moai 12-13

Moai 12-14

Large quantities of stone behind the base of this *moai* prevented resistivity survey. However, among the stones were several deeply buried stones which appeared as part of a curb encircling an area behind the *moai*. This encircled area would be of similar dimensions to the platform uncovered by Heyerdahl and Skjölsvold behind statue 13-477.

Moai 12-172

This *moai* is represented by a broken piece of tuff and may well have been slightly moved from its original location. Consequently, no resistivity was undertaken.

Moai 12-220

Large quantities of stone behind the base of this *moai* (*Figure 18*) prevented resistivity survey. However, it was clear that the base of the statue (which had fallen backwards) had been cut into the ground to create a level surface as the road runs downslope at this point. This cut has been revetted by a crude stonewall of doubtful antiquity.



Figure 18.
Moai 12-220 base in cut in hillslope, showing stone revetment

Moai 12-255

This *moai* has fallen downslope from a small ahu situated at the southern side of the road. This section and ahu was examined by Love (2001). Large quantities of stone behind the base of this *moai* prevented resistivity survey.

Moai 12-397

This *moai* is known as 'Cook's Moai' and has had several archaeological investigations in close vicinity. Patricia Vargas (pers. comm.) excavated around the *moai* but the results are unpublished. It should be noted that she considered the *moai* to lie on the road surface. Charles Love (2001) stripped an area of the road to the east of the *moai*, unaware that it had been previously examined by Vargas.

***Moai* 12-452**

This *moai* was not examined as part of the survey.

5. Discussion

The geophysical survey employing resistivity proved very effective at locating stonework beneath the ground. More excitingly, it revealed the presence of discrete stone platforms behind many of the road *moai*. Unfortunately, stone behind a number of the *moai* prohibited a total survey. However, judging from these results the interpretation that many of the fallen statues once lined the roads on prepared stone platforms appears to be supported by the geophysical survey.

In his edited excavation monograph, Heyerdahl quotes an ancient legend regarding roads on the island:

“When the island was first created and became known to our forefathers, the land was crossed with roads beautifully paved with flat stones. The stones were laid close together so artistically that no rough edges were exposed. Coffee trees were growing close together along the borders of the road, that met overhead, and the branches were laced together like muscles. Heke was the builder of these roads, and it was he, who sat in the place of honour in the middle where the roads branches away in every direction. These roads were cunningly contrived to represent the plan of the web of the grey and black pointed spider, and no man could discover the beginning or the end thereof” (1961, 35).

Although the antiquity of this legend is unknown, it does seem to accurately describe the system of the *moai* roads. It also raises the possibility that the road network that has previously been interpreted as exclusively providing a means of transporting the *moai* (e.g. Love 2001) may be incorrect. Indeed, all the evidence currently available indicates that any characterization of all of the *moai* along the road as ‘in-transit’ is also incorrect. Overall the evidence is suggestive that the so-called *Ara Moai* may be a far more complex route than has previously been realized.

Surveyors: Karina Croucher, Tamsin Parish, Tiki Paoa, Colin Richards
& Kate Welham

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